

## CLAIMS

What is claimed is:

1 1. A method of dynamically updating a user interface in a processing system, the  
2 method comprising:  
3 storing a data set locally in the processing system;  
4 generating a presentation document based on a source document and the data  
5 set; and  
6 responding to an event by  
7 modifying the data set in the processing system,  
8 determining whether the modification to the data set should affect the  
9 presentation document, and  
10 if the modification to the data set should affect the presentation  
11 document, then automatically updating only parts of the presentation document that  
12 correspond to the modification to the data set.

1 2. A method as recited in claim 1, wherein the processing system generates a user  
2 interface, and wherein the method further comprises using the updated presentation  
3 document to update the user interface dynamically.

1 3. A method as recited in claim 1, wherein the source document is written in an  
2 extensible markup language.

1 4. A method as recited in claim 1, wherein:  
2 the source document comprises a tag having a dependency expression as an  
3 attribute;

4           said determining whether the modification to the data set should affect the  
5 presentation document comprises evaluating the dependency expression; and  
6           the method further comprises updating the presentation document, if  
7 appropriate, based on a result of the dependency expression.

1   5. A method of dynamically updating a user interface on a local processing system,  
2 the method comprising:

3           storing data in the local processing system;

4           providing a presentation document in the local processing system based on  
5 the data and a source document written in an extensible markup language, wherein  
6 the presentation document is dependent upon one or more expressions that operate  
7 on the data;

8           rendering the user interface in the local processing system based on the  
9 presentation document;

10          detecting an event in the local processing system;

11          responding to the event in the local processing system by

12               causing a change to the data in the local processing system,

13               determining whether the presentation document is dependent upon at  
14 least one expression, the result of which is affected by the change to the data, and

15               if the presentation document is dependent upon at least one  
16 expression, the result of which is affected by the change to the data, then  
17 automatically updating only one or more parts of the presentation document that  
18 depend on said at least one expression, without updating the entire presentation  
19 document; and

20 rendering the user interface in the local processing system based on the  
21 updated presentation document.

1 6. A method as recited in claim 5, wherein:  
2 the source document comprises a tag having a dependency expression as an  
3 attribute;  
4 said determining comprises evaluating the dependency expression; and  
5 the method further comprises updating the presentation document, if  
6 appropriate, based on the dependency expression.

1 7. A method and apparatus for dynamically updating a user interface in a  
2 processing system, the method comprising:  
3 generating a presentation document in the processing system based on a  
4 stored data model and a source document written in extensible markup language;  
5 rendering the user interface in the processing system based on the  
6 presentation document;  
7 responding to an event in the local processing system by  
8 causing a change to the data set,  
9 determining a set of parts of the presentation document which are  
10 invalid as a result of the change, and  
11 automatically updating only those parts of the presentation document  
12 that are invalid, without updating the entire presentation document; and  
13 rendering the user interface based on the updated presentation document.

1 8. A method as recited in claim 7, wherein the data set is stored locally in the

2 processing system.

1 9. A method as recited in claim 7, wherein:

2 the source document comprises a tag having a dependency expression as an  
3 attribute;

4 said determining a set of segments comprises evaluating the dependency  
5 expression; and

6 the method further comprises updating the presentation document, if  
7 appropriate, based on a result of the dependency expression.

1 10. A method of dynamically updating a user interface on a local processing system,  
2 the method comprising:

3 generating a presentation document based on a source document and a stored  
4 data set; and

5 responding to an event by

6 modifying the data set,

7 determining whether the modification to the data set should affect the  
8 presentation document, and

9 if the modification to the data set should affect the presentation

10 document, then automatically updating the presentation document based on the  
11 modification to the data set.

1 11. A method as recited in claim 10, further comprising storing the data set locally  
2 within the local processing system.

1 12. A method as recited in claim 10, wherein:

2 the source document comprises a tag having a dependency expression as an  
3 attribute;

4 said determining whether the modification to the data set should affect the  
5 presentation document comprises evaluating the dependency expression; and

6 the method further comprises updating the presentation document, if  
7 appropriate, based on the dependency expression.

1 13. A method as recited in claim 10, wherein said automatically updating the  
2 presentation document comprises automatically updating only segments of the  
3 presentation document that correspond to the changed data, without updating the  
4 entire presentation document.

1 14. A method as recited in claim 10, further comprising storing the data set locally  
2 within the local processing system, wherein said automatically updating the  
3 presentation document comprises automatically updating only segments of the  
4 presentation document that depend on the changed data, without updating the  
5 entire presentation document.

1 15. A method as recited in claim 10, wherein the source document is an extensible  
2 markup language document.

1 16. A method of dynamically updating a user interface on a local processing system,  
2 the method comprising:

3 providing a presentation document in the local processing system based on a  
4 source document written in an extensible markup language and a data set;

5 rendering the user interface in the local processing system based on the

6 presentation document;  
7 detecting an event in the local processing system;  
8 responding to the event in the local processing system by  
9 causing a change to the data in the local processing system,  
10 determining whether the presentation document is dependent upon  
11 the changed data, and  
12 if the presentation document is dependent upon the changed data, then  
13 automatically updating the presentation document based on the change to the data;  
14 and  
15 rendering the user interface in the local processing system based on the  
16 updated presentation document.

1 17. A method as recited in claim 16, further comprising storing the data set locally  
2 within the local processing system.

1 18. A method as recited in claim 16, further comprising storing the data set locally  
2 within the local processing system, wherein said automatically updating the  
3 presentation document comprises automatically updating only one or more  
4 segments of the presentation document that depend on the changed data, without  
5 updating the entire presentation document.

1 19. A method as recited in claim 16, wherein:  
2 the source document comprises a tag having a dependency expression as an  
3 attribute;  
4 said determining whether the presentation document is dependent upon the

changed data comprises evaluating the dependency expression; and  
the method further comprises updating the presentation document, if  
appropriate, based on a result of the dependency expression.

20. A method of dynamically updating a user interface on a local processing system,  
the method comprising:

generating a presentation document based on a source document and a stored  
data set; and

responding to an event by

modifying the data set,

determining whether the modification to the data set should affect the  
presentation document, and

if the modification to the data set should affect the presentation  
document, then updating only segments of the presentation document that  
correspond to the changed data, without updating the entire presentation document.

21. A method as recited in claim 20, further comprising storing the data set locally  
within the local processing system.

22. A method as recited in claim 20, wherein said updating comprises automatically  
updating only segments of the presentation document that depend on the changed  
data.

23. A method as recited in claim 20, further comprising storing the data set locally  
within the local processing system, wherein said updating the presentation  
document comprises automatically updating only segments of the presentation

4 document that depend on the changed data.

1 24. A method as recited in claim 20, wherein the source document comprises a tag  
2 having a dependency expression as an attribute, and wherein said determining  
3 whether the modification to the data set should affect the presentation document  
4 comprises evaluating the dependency expression.

1 25. A method as recited in claim 20, wherein the source document is an extensible  
2 markup language document.

1 26. A method of dynamically updating a user interface on a local processing system,  
2 the method comprising:

3 providing a presentation document in the local processing system based on a  
4 source document written in an extensible markup language and a data set;

5 rendering the user interface in the local processing system based on the  
6 presentation document;

7 detecting an event in the local processing system;

8 responding to the event in the local processing system by

9 causing a change to the data set in the local processing system,

10 determining whether the presentation document is dependent upon  
11 the data changed by the change to the data set, and

12 if the presentation document is dependent upon the changed data, then  
13 updating only one or more segments of the presentation document that depend on  
14 said changed data, without updating the entire presentation document; and

15 rendering the user interface in the local processing system based on the



16 updated presentation document.

1 27. A method as recited in claim 26, wherein said updating comprises automatically  
2 updating said one or more segments of the presentation document that depend on  
3 said changed data.

1 28. A method as recited in claim 26, wherein the source document comprises a tag  
2 having a dependency expression as an attribute, and wherein said determining  
3 whether the presentation document is dependent upon the data changed by the  
4 change to the data set comprises evaluating the dependency expression.

1 29. A method as recited in claim 26, further comprising storing the data set within  
2 the local processing system.

1 30. A method as recited in claim 26, wherein said updating comprises automatically  
2 updating said one or more segments of the presentation document that depend on  
3 said changed data;  
4 the method further comprising storing the data set within the local processing  
5 system.

1 31. A method of dynamically updating a user interface on a local processing system,  
2 the method comprising:  
3 storing, in the local processing system, a data set for use in generating a  
4 presentation document;  
5 generating a presentation document based on a source document and the  
6 stored data set; and

7           responding to an event by  
8           modifying the data set in the local processing system,  
9           determining whether the modification to the data set should affect the  
10 presentation document, and  
11           if the modification to the data set should affect the presentation  
12 document, then updating the presentation document based on the modification to  
13 the data set.

1   32. A method as recited in claim 31, wherein said updating comprises automatically  
2 updating the presentation document.

1   33. A method as recited in claim 31, wherein the source document comprises a tag  
2 having a dependency expression as an attribute, and wherein said determining  
3 whether the modification to the data set should affect the presentation document  
4 comprises evaluating the dependency expression.

1   34. A method as recited in claim 31, wherein said updating comprises updating only  
2 segments of the presentation document that correspond to the changed data.

1   35. A method as recited in claim 31, wherein said updating comprises automatically  
2 updating only segments of the presentation document that depend on the changed  
3 data.

1   36. A method as recited in claim 31, wherein the source document is written in an  
2 extensible markup language.

1 37. A method of dynamically updating a user interface on a local processing system,  
2 the method comprising:  
3 storing data in the local processing system;  
4 providing a presentation document in the local processing system based on a  
5 source document written in an extensible markup language and the data;  
6 rendering the user interface in the local processing system based on the  
7 presentation document;  
8 detecting an event in the local processing system;  
9 responding to the event in the local processing system by  
10 causing a change to the data in the local processing system,  
11 determining whether the presentation document is dependent upon  
12 the changed data, and  
13 if the presentation document is dependent upon the changed data, then  
14 updating the presentation document based on the change to the data; and  
15 rendering the user interface in the local processing system based on the  
16 updated presentation document.

1 38. A method as recited in claim 37, wherein said updating the presentation  
2 document comprises automatically updating the presentation document in response  
3 to the event.

1 39. A method as recited in claim 37, wherein the source document comprises a tag  
2 having a dependency expression as an attribute, and wherein said determining  
3 whether the presentation document is dependent upon the changed data comprises  
4 evaluating the dependency expression.

1 40. A method as recited in claim 37, wherein said updating comprises updating only  
2 one or more segments of the presentation document that depend on the changed  
3 data, without updating the entire presentation document.

1 41. A method as recited in claim 37, wherein said updating the presentation  
2 document comprises automatically updating only one or more segments of the  
3 presentation document that depend on the changed data, without updating the  
4 entire presentation document.

1 42. A machine-readable storage medium containing instructions which, when  
2 executed by a machine, configure the machine to perform a method and apparatus  
3 for dynamically updating a user interface in a processing system, the method  
4 comprising:

5 storing a data set locally in the processing system;

6 generating a presentation document in the processing system based on the  
7 data model and a source document written in extensible markup language;

8 rendering the user interface in the processing system based on the  
9 presentation document;

10 responding to an event in the local processing system by

11 causing a change to the data set,

12 determining a set of parts of the presentation document which are  
13 invalid as a result of the change, and

14 automatically updating only those parts of the presentation document  
15 that are invalid, without updating the entire presentation document; and

16 rendering the user interface based on the updated presentation document.

1 43. A machine-readable storage medium as recited in claim 42, wherein:  
2 the source document comprises a tag having a dependency expression as an  
3 attribute;  
4 said determining a set of segments comprises evaluating the dependency  
5 expression; and  
6 the method further comprises updating the presentation document, if  
7 appropriate, based on a result of the dependency expression.

1 44. A computing device comprising:  
2 a processor;  
3 an output device;  
4 a first storage unit containing a data set for use in generating an extensible  
5 markup language based presentation document; and  
6 a second storage unit containing instructions which configure the processor to  
7 generate the presentation document based on a source document  
8 written in an extensible markup language and the data set, wherein the presentation  
9 document is dependent upon one or more expressions that operate on the data;  
10 present a user interface at the output device based on the presentation  
11 document;  
12 detect an event; and  
13 respond to the event by  
14 causing a change to the data set,  
15 determine whether the presentation document is dependent  
16 upon at least one expression, the result of which is affected by the change to the data,

17 and  
18 if the presentation document is dependent upon at least one  
19 expression, the result of which is affected by the change to the data, then  
20 automatically updating only one or more segments of the presentation document  
21 that depend on said at least one expression, without updating the entire presentation  
22 document, and  
23 present the user interface at the output device based on the  
24 updated presentation document.

1 45. A computing device as recited in claim 44, wherein the computing device is a  
2 wireless, hand-held computing device.

1 46. A computing device as recited in claim 45, wherein the computing device is  
2 configured to receive the source document from a remote server over a network.

1 47. A computing device as recited in claim 44, wherein:  
2 the source document comprises a tag having a dependency expression as an  
3 attribute; and  
4 the method further comprises updating the presentation document, if  
5 appropriate, based on the dependency expression.